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| 09/943,705      | 08/31/2001  | Ashraf El-Sadi       | Q01-1044-US1        | 2218             |

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EXAMINER

MCCLLOUD, RENATA D

| ART UNIT | PAPER NUMBER |
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2837

DATE MAILED: 10/24/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/943,705

Applicant(s)

EL-SADI, ASHRAF

Examiner

Renata McCloud

Art Unit

2837

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 31 August 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-63 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4,6-30,34-46,48-50,55-58,61 and 63 is/are rejected.
- 7) ☒ Claim(s) 5,31-33,47,51-54,59,60 and 62 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

### *Specification*

1. The disclosure is objected to because of the following informalities:
  - a. On page 4, line 14, the limitation “moter” is misspelled. It should be spelled “motor”
  - b. On page 9, line 20, the word “control” needs an “s” at the end. It should be spelled “controls”.
  - c. On page 10, line 25 contains the limitation “integrated drip (“IC”)”. This limitation should be “integrated chip (“IC”)”
  - d. On page 12, lines 7-8, item “224” is referred to as the “Integrator” in the drawings, whereas in line 22, item “224” is referred to as the “Compensator”. Reference to an item in a drawing needs to be consistent.
  - e. The abstract of the disclosure is objected to because the limitation “integrator” is recited in line 7. In the specification, the term “compensator” is described as the object that performs integration. Component terminology must be consistent. Correction is required. See MPEP § 608.01(b).

Appropriate correction is required.

***Claim Objections***

2. Applicant is advised that should claim 15 be found allowable, claim 19 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 12 is rejected under 35 U.S.C. 112, second paragraph, for having the following informalities:

a. The limitation "said integrator" is recited. There is insufficient antecedent basis for this limitation in the claim.

b. Claim 12 fails to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The limitation "The driver of claim 12" is recited. A claim cannot be dependent upon itself.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-3, 6-30, 34-41, 43-46, 48, and 49 are rejected under 35 U.S.C. 102(b) as being anticipated by Mortazavi et al (U.S. Patent 5,838,515).

Mortazavi et al teach the following:

Referring to claim 1, a driver having a current control device for a voice coil motor (VCM) in a disk drive with a sensor to sense coil current (e.g. Column 3, Lines 59-60), a transconductance amplifier to detect error, and a compensator to integrate the current error (e.g. Column 3, Line 66- Column 4, Line 5);

referring to claim 2, a force couple created by the current in the VCM (e.g. Column 10, Lines 20-26);

referring to claim 3, a current sense amplifier coupled to a transconductance amplifier (e.g. Column 7, Lines 36- 51);

referring to claim 6, the compensator including a capacitor (e.g. Figure 2, Item C4);

referring to claim 7, the compensator including a resistor (e.g. Figure 2, Item R3);

referring to claim 8, a driver amplifier to supply the coil current and the driver amplifier coupled to the compensator (e.g. Figure 2, Item 56);

referring to claim 9, the sensor including a sense resistor (e.g. Figure 2, Item R5);

referring to claim 10, the command current received at the driver from a microcontroller (e.g. Column 5, Lines 59-63);

referring to claim 11, the compensator coupled to the transconductance amplifier (Figure 2, Item 56 connected to Item 64 at Item 60);

referring to claim 12, the driver including a capacitor (e.g. Figure 2, Item C4);

referring to claim 13, the compensator coupled to a gain buffer (e.g. Column 7, Lines 13-25, the driver includes buffer 46 in figure 1, which is used for transferring data, such as gain);

referring to claim 14, a method for tracking a disk using a voice coil motor coupled to a driver by sensing a coil current (e.g. Column 4, Lines 39-41), determining an error current and command current (e.g. Column 4, Lines 42-43), and integrating the error current into the coil current (e.g. Column 4, Lines 44-45);

referring to claims 15 and 19, amplifying the coil current (e.g. Column 4, Lines 42-43);

referring to claim 16, receiving the command current at the driver (e.g. Column 4, Lines 47-48);

referring to claim 17, inducing a magnetic field in the VCM (e.g. Column 7, Lines 30-35);

referring to claim 18, sensing a voltage and determining the coil current from the voltage (e.g. Column 7, Lines 35-47);

referring to claim 20, determining the error current with a transconductance amplifier (e.g. Column 4, Lines 42-43);

referring to claim 21, comparing the coil current and the command current at the transconductance amplifier (e.g. Column 3, Line 66-Column 4, Line 4);

referring to claim 22, compensating for the error current (e.g. Column 4, Lines 44-46);

referring to claim 23, a current control device for a voice coil motor (VCM) drive with the VCM driver coupled to a microprocessor to receive commands specifying a command current for a VCM (e.g. Column 5, Lines 28-40) with an amplifier to drive the VCM with a coil current (e.g. Figure 2, Item 56) and a compensator to integrate the error current with the command current to generate the coil current and the error current detected with a sensor (e.g. Column 6, Lines 52-54) coupled between the amplifier and the VCM (e.g. Figure 2, Item R5);

referring to claim 24, a transconductance amplifier (e.g. Column 6, Lines 50-57);

referring to claim 25, the error current correlates to a voltage across the sensor (e.g. Column 4, Lines 39-46);

referring to claim 26, the sensor being a resistor (e.g. Column 6, Line 65);

referring to claim 27, the current sense amplifier (66) coupled between a sensor (R5) and the integrator (56) to amplify a voltage (e.g. Figure 2);

referring to claim 28, the amplifier coupled to a set of transistors (e.g. Column 3, Lines 13-16);

referring to claim 29, a driver having a current control device for a voice coil motor with an amplifier to drive the vcm with a coil current and the current flows from one terminal of the vcm to another terminal (e.g. Column 3, Lines 10-16), a sensor coupled between the amplifier and the vcm (e.g. Figure 2, Item R5), a current sense amplifier that amplifies a voltage across a sensor where the voltage correlates to the coil current (e.g. Figure 2, Item 66), a transconductance amplifier coupled to a current sense amplifier that calculates an error current (e.g. Figure 2, Item 64), and an integrator couple to the transconductance amplifier to integrate the error current into the coil current (e.g. Figure 2, Items C4, R3);

referring to claim 30, a driver having a current controller for a vcm in seek mode with a set of transistors coupled to a vcm by a center tap (e.g. Column 9, Lines 51-59, Figure 3), a current sense amplifier (e.g. Figure 3, Item 66), a comparator (e.g. Column 9, Lines 14-15), and a bipolar switch control (e.g. Column 9, Lines 61-63);

referring to claim 34, the transistors include a first and second transistor (e.g. Figure 3, Items 90, 94);

referring to claim 35, the set of transistors includes dynamic MOS transistors (e.g. Figure 3, Items 90, 94);

referring to claim 36, the command current waveform has a duty cycle such that a bipolar switch control is turned on and off according to the duty cycle (e.g. Column 12, Lines 17-39, Figures 5A, 5B);



referring to claim 37, the command current is received from a microcontroller (e.g. Column 8, Lines 19-27);

referring to claim 38, a method for controlling a VCM accessing a track on a magnetic disk with a driver comprising: supplying a coil current (e.g. Column 11, Lines 12-15), amplifying the coil current (e.g. Column 4, Lines 42-43), and shaping a command current waveform according to the coil current (e.g. Column 12, Lines 20-39);

referring to claim 39, receiving the command current waveform at a bipolar switch (e.g. Column 9, Lines 59-63);

referring to claim 40, saturating a set of transistors coupling the bipolar switch with the voice coil motor (e.g. Column 8, Lines 13-15, Figure 3, Items 62, 64, 90, 94);

referring to claim 41, turning the transistors on and off with the bipolar switch (e.g. Column 12, Lines 27-28);

referring to claim 42, supplying the coil current to a center tap coupling the voice coil motor to the driver (e.g. Column 9, Lines 51-58);

referring to claim 43, amplifying the coil current (e.g. Column 4, Lines 42-43);

referring to claim 44, a current control device within a driver for controlling a vcm to seek a track with a coil current supplied to the vcm along a center tap (e.g. Column 9, Lines 51-58), a comparator to shape the waveform of a command current where the command current drives a bipolar switch (e.g. Figure 3, Item 74);

referring to claim 45, a current sense amplifier (e.g. Figure 3, Item 66);

referring to claim 46, a set of transistors coupled to a bipolar switch and center tap, wherein the transistors are turned on and off (e.g. Column 9, Lines 51-61);

referring to claim 48, a driver having a current control device for controlling a VCM in seek mode having a current sense amplifier (e.g. Figure 3, Item 66) wherein the coil current is supplied by a center tap (e.g. Column 9, Lines 51-58), a current command to specify a command current (e.g. Column 9, Lines 51-58), a comparator coupled to the current sense amplifier to receive the current command (e.g. Figure 3, Items 66, 74), and a bipolar switch coupled to the comparator (e.g. Column 9, Lines 61-63); and referring to claim 49, dynamic MOS transistors (e.g. Figure 3, Items 90,94).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mortazavi et al as applied to claim 1 above, in view of Mohlere (U.S. Patent 4,422,027).

Mortazavi et al teach the invention of claim 1, however, they do not teach the voice coil motor having a first coil motor and a second coil motor. Mohlere teaches this (e.g. Figure 2, Items Unit1, and Unit 2). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention as taught by Mortazavi et al to include two coil motors as taught by Mohlere. The advantage of this would be improved velocity control.

6. Claims 50, 57, 58, 61, and 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mohlere (U.S. Patent 4,422,027) in view of Hassan et al (U.S. Patent 5,821,717).

Referring to claims 50 and 58, Mohlere teaches a driver and a method for controlling a voice coil motor (e.g. Figure 2) having a first coil motor and a second coil motor (e.g. Figure 2, Items Unit 1, and Unit 2, Column 1, Lines 10-14 and Lines 60-62), comprising a sensor to sense a velocity voltage across a coil motor (e.g. Column 2, Lines 40-45). However it is unclear if Mohlere teaches the remainder of the claim. Hassan et al teach the remainder of the claim as follows: an error amplifier to calculate a differential between a velocity voltage and a command voltage (e.g. Column 3, Lines 20-37) and a retract amplifier to compensate a command voltage with a differential (e.g. Figure 2, Item 113, Column 5, Lines 37-67). Hassan et al also teach the following: referring to claims 57 and 63, the retract amplifier being turned on and off (e.g. Column 5, Lines 37- 67); and referring to claim 61, the retract amplifier coupled to the voice coil motor (e.g. Figure 2, Item 131 connected to 300). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Mohlere to include the teaching of Hassan et al. The advantage of this would be the improvement in velocity control and the reduction of both noise and complicated circuitry.

7. Claims 55 and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mohlere in view of Hassan et al as applied to claim 50 above, and further in view of Mortazavi et al (U.S. Patent 5,838,515).

Mohlere in view of Hassan et al teach the invention of claim 50. However, they do not teach the coil motors comprising coil windings. Mortazavi et al teach this (e.g. Figure 2, Item

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24). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention taught by Mohlere in view of Hassan et al to include the coil motors comprising coil windings as taught by Mortazavi et al. The advantage of this would be the improvement of the velocity control of the driver.

*Allowable Subject Matter*

8. Claims 5, 31-33, 47, 51-54, 59, 60, and 62 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The reason for this is that it is unclear if any of the references previously mentioned teach the following: a first coil motor and a second coil motor coupled in series, a driver in which the first coil motor and a second coil motor coupled to a center tap;

a current control device within a driver for controlling a voice coil motor to seek a track on a storage media where the center tap supplies first and second coil motor currents to a first coil motor and a second coil motor;

a driver for controlling a voice coil motor with first and second coil motors during retract mode comprising a differential amplifier coupled to the error amplifier and a retract amplifier coupled to the compensator; and

a method for controlling a voice coil motor having a first coil motor and a second coil motor with a driver during retract mode comprising detecting a velocity voltage with the second coil motor, determining a differential voltage between the velocity voltage and a command

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voltage, compensating the command voltage with the differential voltage, also including a detecting step using a differential amplifier coupled to the second coil motor that includes applying a current correlating to the command voltage to the first coil motor and a compensating step using retract amplifier coupled to the voice coil motor.

***Conclusion***

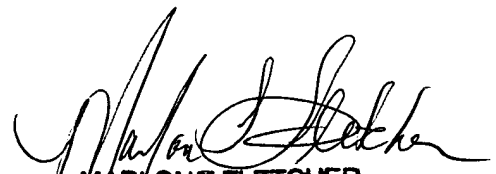
9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Renata McCloud whose telephone number is (703) 308-1763. The examiner can normally be reached on Mon.-Thurs and every other Fri. from 8 am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Nappi can be reached on (703) 308-3370. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Renata McCloud  
Examiner  
Art Unit 2837

RDM  
October 21, 2002

  
MARLON T. FLETCHER  
PRIMARY EXAMINER